

University of Houston
Department of Mathematics
Math 3338: Probability

Prerequisite: Math 1432.

Course Description: Sample spaces, events and probabilities; random variables and distributions; expectations, variances and covariances; basic discrete and continuous distributions; the central limit theorem.

Text: *Modern Mathematical Statistics, with Applications*, by J.L. Devore and K.N. Berk, Thomson Learning, 2007.

| Chapter and Section | Suggested Exercises |
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| Chapter 1: Descriptive Statistics | |
| 1.1: Populations and Samples | Read |
| 1.2: Pictorial and Tabular Methods | 13, 21 |
| 1.3: Measures of Location | 33, 38, 39 |
| 1.4: Measures of Variability | 41, 48, 54 |
| Chapter 2: Probability | |
| 2.1: Sample Spaces and Events | 4, 5, 8, 10, 11 |
| 2.2: Axioms, Interpretations, and Properties | 14, 15, 17, 20, 22, 28 |
| 2.3: Counting Techniques | 31, 33, 35, 36, 40 |
| 2.4: Conditional Probability | 45, 47, 48, 49, 54, 64 |
| 2.5: Independence | 67, 70, 71, 75, 77, 78, 81 |
| Chapter 3: Discrete Random Variables | |
| 3.1: Random Variables | 1, 5, 6, 7, 8 |
| 3.2: Discrete Distributions | 12, 13, 14, 17, 18, 27 |
| 3.3: Expected Values | 28, 29, 31, 32, 33, 36, 40, 43 |
| 3.4: Moments and Moment Generating Functions | 45, 46, 47, 49, 54 |
| 3.5: Binomial Distributions | 58, 59, 60, 61, 66, 68, 69, 75, 77 |
| 3.6: Hypergeometric and Negative Binomial Distributions | 80, 81, 83, 86, 91, 92 |
| 3.7: Poisson Distributions | 93, 94, 97, 98, 99, 101, 104, 108 |
| Chapter 4: Continuous Random Variables | |
| 4.1: Density Functions and Cumulative Distribution Functions | 1, 3, 4, 7, 10, 11, 13, 17 |
| 4.2: Expected Values and MGFs | 18, 23, 24, 27, 28, 31, 33 |
| 4.3: Normal Distributions | 39, 40, 41, 42, 43, 45, 49, 60, 62, 63, 66 |

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| 4.4: Gamma Distributions | 69, 70, 71, 75, 78, 80 |
| 4.5: Other Continuous Distributions | 82, 86, 89, 95 |
| 4.6: Probability Plots* | 97, 98 |
| 4.7: Transformations | 108, 111, 112, 114 |

Chapter 5: Joint Distributions

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| 5.1: Jointly Distributed Random Variables | 1, 2, 7, 9, 11, 17 |
| 5.2: Expected Values, Covariance, Correlation | 18, 21, 22, 24, 25, 26, 29, 33 |
| 5.3: Conditional Distributions* | 36, 37, 38, 44, 45 |
| 5.5: Order Statistics* | 65, 66, 68, 70 |

Chapter 6: Statistics and Sampling Distributions

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| 6.1: Statistics and Their Distributions | 1, 3, 4, 7 |
| 6.2: The Distribution of the Sample Mean | 11, 12, 13, 16, 17, 19, 21, 24 |
| 6.3: Linear Combinations | 28, 29, 33, 34, 37, 39 |
| 6.4: Distributions Based on a Normal Sample* | 46, 50, 51, 59 |

* Starred sections are to be covered if time permits.